THE NAVY AS A MOTOR IN GEOGRAPHICAL AND COMMERCIAL PROGRESS.

BY

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It is by victorious battle that a navy is heralded to the bosom of a people, and through the value of its peaceful pursuits that it is nurtured and sustained there. The spirit of honorable adventure which prompts voyages of exploration and the persistent striving against the obstacles of nature which results in the acquisition of fresh information and the discovery of new lands have placed the naval service of the United States among the forceful agencies of the nineteenth century in extending the confines of knowledge to a wider horizon and in opening avenues through which the industries of the people have poured millions of treasure into the nation's lap, and coördinated it with the missions of the Christian Church in bringing the people of distant lands within the generous folds of Western civilization.

Aside from guiding the sea-going shipping of a hemisphere by its Ephemeris and nautical charts, and aside from the considerable part which this service has taken in the discovery and delineation of the lands of the globe and in the collections of the plants, animals, and ethnological material which form the basis of our national institutions for the increase and diffusion of knowledge concerning the arts of life, is its grand contribution to our knowledge of the sea brought about by the impulse which it was the first to give to deep-sea sounding to which submarine telegraphy owes so much, and by its investigations into the laws of the winds and currents of the ocean through which, for commercial purposes, antipodal points have been brought nearer together by many days' sail.

Before the time of the project for the Atlantic telegraph cable there seemed to be no practicable value attached to a knowledge of the depths of the sea and, beyond a few doubtful results obtained for purely scientific purposes, nothing was clearly known of bathymetry, or of the geology of the sea bottom. The advent of submarine cables gave rise to the necessity for an accurate knowledge of the bed of the ocean where they were laid, and lent a stimulus to all forms of deep-sea investigation. While the apparatus for sounding the sea consisted of a weight secured to the end of a hempen cord

which was paid out from a simple reel on the deck of a vessel, no reliability could be attained in the measurement of depths, because the cord employed, in order to be strong enough to haul the sinker in, was necessarily so large as to become a controlling element in the weight of the system. The few attempts to sound that were made during the first half of the present century gave rise to the reports of the vast depths of the sea that astonished the public mind fifty years ago. Lieutenant Berryman of the United States brig *Dolphin* reported an unsuccessful attempt to fathom mid-ocean with a line thirty-nine thousand feet in length. Captain Denham, of her Britannic Majesty's ship *Herald*, reported bottom in the South Atlantic at a depth of forty-six thousand feet; and Lieutenant Parker, of the United States frigate *Congress*, in attempting to sound the same region, let go his plummet and saw fifty thousand feet of line run out after it as though the bottom had not been reached. The deepest spot in the South Atlantic is not more than twenty thousand feet beneath the surface; and the deepest spot yet discovered in the world not more than thirty thousand feet.

For the development of accurate knowledge of the depths of the sea the world will ever be indebted to the genius of Midshipman Brooke, of the United States Navy, who, somewhat after the middle of the century, made the first great improvement in deep-sea sounding by inventing an implement in which the sinker, enveloping a tube secured to the sounding line, was detached on striking the bottom and left behind when the tube was drawn up. This invention paved the way for the adaptation of piano-forte wire to successful use as a sounding line, and led up to the inventions of Commander Sigsbee who, besides contributing by his inventive genius most of the instruments used in modern deep-sea research, in 1875 achieved the crowning triumph of the art in his elaborate deep-sea sounding machine, by which, while relieving the delicate sounding wire from the sudden strains to which it would otherwise be exposed by the pitching of the ship while lying to for the purpose of sounding, the profoundest depths are measured with celerity and exactness.

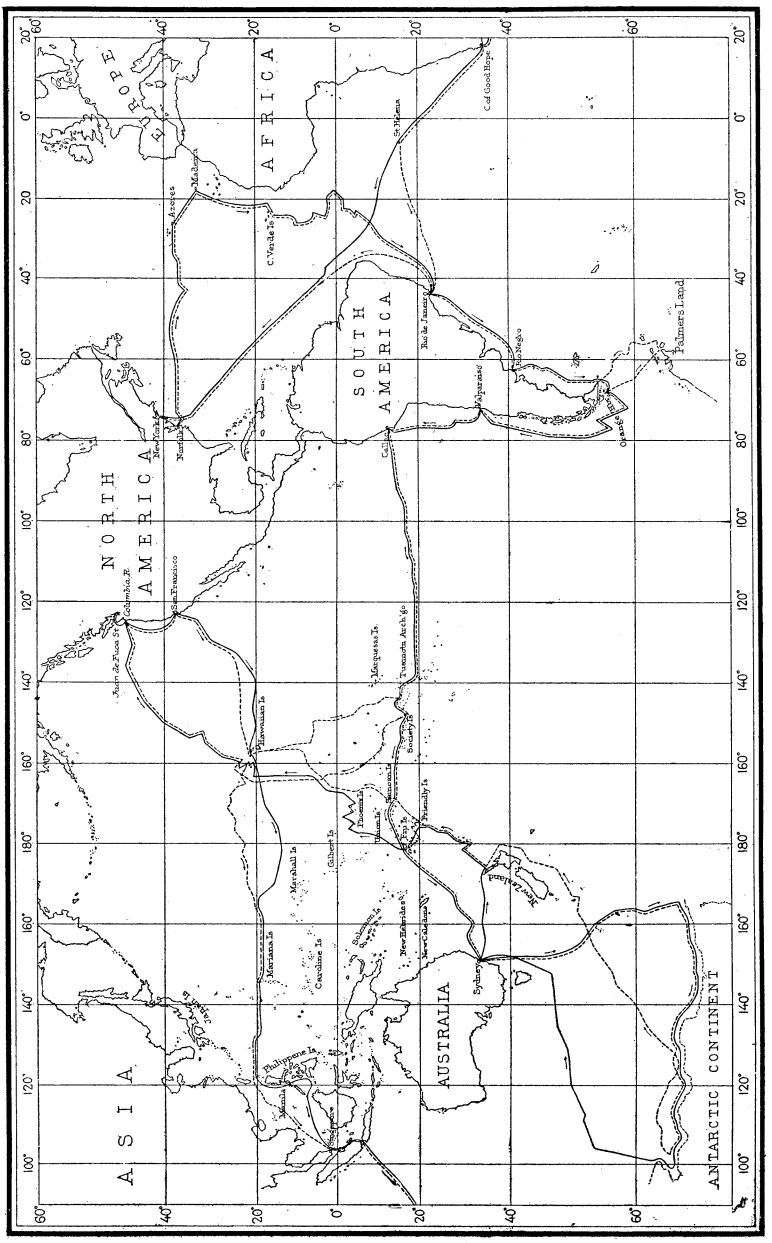
THE UNITED STATES EXPLORING EXPEDITION.—Scarcely a decade had passed after the close of the second war for independence before there began to be discernible among our people a feeling that the nation had not shared in geographical exploration to an extent commensurate with her maritime importance. It was near the end of the period of great geographical discoveries among the island

groups of the Pacific Ocean, but at a time when little of that part of the world had been even rudely charted, and when much remained to be disclosed concerning its physical nature, and the characteristics of vegetable, animal, and human life there. Vessels of the British, Dutch, French, Portuguese, Russian, and Spanish governments had been dispatched to the Pacific on voyages of discovery and exploration, but their researches had left the Fiji and Samoan islands, and the groups now known as Micronesia unknown, in comparison with the knowledge that had been ascertained concerning the Society Islands, the Friendly Islands, the Hawaiian Islands, and New Zealand. So vast is the extent of Polynesia and so hastily were the first explorations conducted and so inadequate the equipment of the voyagers for gathering geographical information that it was often difficult to identify their discoveries and sometimes impossible for the discoverers to return to the islands discovered. The inaccuracy of the observations upon which islands, rocks, and shoals were located was constantly exemplified in the occurrence of shipwreck and disaster to those who were obliged to navigate by the charts based upon them.

At this period there was no nation whose commercial interests were more important in the Pacific than the United States. The whaling fleet of this country at that time comprised more than six hundred vessels having an aggregate capacity of 200,000 tons, or one-tenth of the total tonnage of the United States, giving employment to twelve thousand men, and requiring a capital then estimated at $12,000,000. In the year 1835 the produce of this fleet amounted to $5,607,000. The dangers incurred by this large number of vessels through deficient geographical knowledge were considered as a sufficient justification for the expenditure necessary to equip and maintain an expedition for the improvement of these poor conditions, but besides this was the incentive for further discoveries in the Antarctic regions growing out of a well established impression that a continent existed in the region of the South Pole.

The instructions issued by the Navy Department in August, 1838, to Lieut. Charles Wilkes, who had been selected to command the Exploring Squadron, state

"that Congress having in view the important interests of our commerce embarked in the whale fisheries and other adventures in the great Southern Ocean, by an Act of the 18th of May, 1836, authorized an Expedition to be fitted out for the purpose of exploring and surveying that sea, as well as to determine the existence of all doubtful islands and shoals, and to discover and accurately fix the position of those which lie in or near the track of our vessels in that quarter and may have escaped the observation of scientific navigators."


THE TRACK OF THE UNITED STATES EXPLORING EXPEDITION
1838—1844
VINCENNES
PORPOISE
NORTH AMERICA
SOUTH AMERICA
AFRICA
EUROPE
ASIA
AUSTRALIA
ANTARCTIC CONTINENT
Cape Horn
Cape of Good Hope
St. Helena
Madeira
Azores
C. Verde Is.
Rio de Janeiro
Valparaiso
Callao
Sandwich Is.
Marquesas Is.
Tuamotu Archipelago
Society Is.
Tahiti
Navigators Is.
Fejee Is.
Friendly Is.
New Caledonia
New Zealand
Sydney
Hawaiian Is.
Columbia R.
San Francisco
Kurile Is.
Japan
Manila
Philippine Is.
Caroline Is.
Marshall Is.
Gilbert Is.
Mariana Is.
Palmers Land

According to the tenor of these instructions, the researches in astronomy, terrestrial magnetism, and meteorology, and the hydrography and geography of the seas and countries to be visited were confided to the naval officers of the Expedition, while a corps of civilian scientists consisting of Horatio Hale, philologist, Charles Pickering and T. R. Peale, naturalists, Joseph P. Couthouy, conchologist, James D. Dana, mineralogist, William Rich, botanist, Joseph Drayton and Alfred T. Agate, draughtsmen, J. D. Brackenridge, horticulturist, was distributed among the different vessels for the purpose of promoting the acquisition of knowledge and extending the bounds of science.

Wilkes sailed from Norfolk on the 18th of August, 1838, with a squadron composed of the *Vincennes*, *Peacock*, *Porpoise*, *Sea Gull*, *Flying Fish*, and *Relief;* and, after crossing the Atlantic Ocean to Madeira and recrossing to the coast of South America, refitted his ships in the harbor of Rio de Janeiro and then proceeded southward along the continent of South America to the Strait of Magellan which was reached in February, 1839. Although its chief field of operations was to be in the Pacific, observations in every branch of inquiry that fell within the scope of the Expedition were carried on throughout the progress of the squadron in the Atlantic, and resulted in an important contribution to our knowledge of the parts visited.

Immediately upon the arrival of the squadron in Orange Bay, Tierra del Fuego, preparations were made for a cruise in the Antarctic regions with the purpose of exploring Palmer's Land which, it was supposed, would be reached in the vicinity of the Ne Plus Ultra of Capt. Cook, the famous British navigator. Many surveys were made in the Patagonian Archipelago and the region to the southward of Cape Horn was penetrated and explored as high as the 70th degree of latitude before the Expedition turned northward along the west coast of South America.

Upon the departure from Callao in July, 1839, to commence the operations in the Pacific, the squadron was reduced to four vessels. The *Sea Gull* had been lost in penetrating the Antarctic seas, and the *Relief* had been ordered home by way of the Hawaiian Islands and Australia with directions to leave stores for the Expedition at Sydney, and to make various geographical researches on the way. To realize the magnitude of the operations that Wilkes with his patience, intelligence, energy, and courage carried on for the benefit of the nation and for civilization, let it be stated that he was then entering an imperfectly explored region covering ten million

square miles, or one-fifth of the earth's surface, and studded with more than 1,800 islands and many thousand reefs. In the course of three years his command visited and described the Tuamotu Archipelago, the Society Islands, the Samoan Islands, the Friendly, Ellice, Mulgrave, and Gilbert groups, the Hawaiian and Philippine Islands, and, coursing from the Columbia River and Puget Sound at one end of the Pacific to the Philippines, New Zealand, and Australia at the other, charted more than five hundred islands and atolls together with one hundred harbors indenting their shores, and accompanied them by sailing directions and determinations of the tides and currents. So well and completely was the geographical and hydrographical work done in the Low Archipelago, the Samoan, Friendly, Gilbert, and Mulgrave groups and in the Hawaiian Islands that, to this day, the charts of those regions issued to mariners are based upon the surveys by this Exploring Expedition. Series of magnetic observations for declination, dip, and intensity were made at fifty-seven stations and the diurnal variation of the needle was observed wherever time permitted the erection of an observatory for that purpose. For the determination of the Southern Magnetic Pole, observations were contributed from 35° easterly to 59° westerly declination, between longitudes 97° and 165° east of Greenwich, nearly on the same parallel of latitude; which gave numerous convergent lines through the space leading to its position. At each of the important points of the cruise an observatory was established for determining longitude by observations of moon-culminating stars and latitude by circum-meridian observations of celestial bodies: meridian distances were established throughout the route by the transportation of chronometers for time, and every opportunity was taken to deduce the true positions of islands and reefs by observations made on shore.

Frequent observations of the temperature of the sea were made at different depths, surface currents were observed, and meteorological phenomena were carefully registered. The number of drawings brought home amounted to two thousand sheets, including those relating to costumes, scenery, and natural history. Large collections in every branch of natural history were secured; in botany about ten thousand species were obtained, including about one hundred specimens of living plants among which were several East Indian fruits that were rarely found in American and European conservatories; in geology and mineralogy much industry and research were expended, and about eleven hundred species of crustacea were figured, comprising many new forms illustrative of gen-

eral anatomy and physiology; and a vast museum of the implements, dress, ornaments, and manufactures of these distant peoples was formed, and continues until the present to lend an important means of studying the conditions of uncivilized man in the remote quarters of the globe.

Passing from the Samoan Islands to Australia, the *Vincennes*, *Peacock* and *Porpoise* prepared for the mission which so much fascinated Wilkes and which led to his brilliant achievement in the discovery of an Antarctic continent lying southward of Australia. The three vessels headed south from Sydney on the day after Christmas in 1839, and falling in with the land in latitude 64° south, and longitude 158° east of Greenwich on the 16th of January following, skirted the new continent to the eastward as far as longitude 97° east. Returning to Sydney he announced his discovery in the following words, in a report to the Secretary of the Navy, dated March 11, 1840:

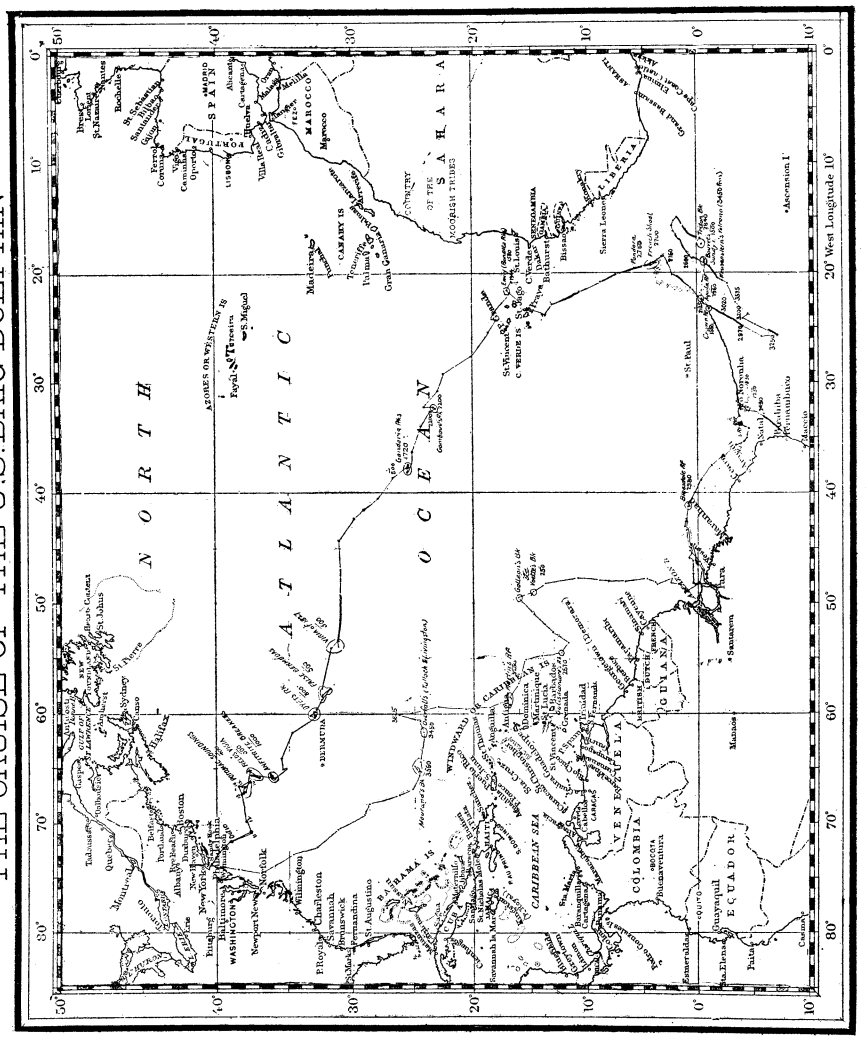
"It affords me much gratification to report that we have discovered a large body of land within the Antarctic Circle, which I have named the Antarctic Continent, and refer you to the report of our cruise and accompanying charts, inclosed herewith, for full information relative thereto."

By the summer of 1841 Wilkes had again worked his way through different groups of the Pacific Archipelago and through the waters which separate British Columbia from what is now the State of Washington, to San Francisco, then in the Mexican province of California, and, setting sail from there, crossed the Pacific Ocean to the Philippine Islands by way of Hawaii, little thinking that he was traversing the route which was to become, within the lifetime of children then born, the great highway between the holdings of his country in the Pacific.

Leaving Manila, the Indian and Atlantic seas mirrored the progress of home-coming ships that bore not only the greatest single contribution that America has made to foreign geography, but also the researches out of which grew the "Chronological History of Plants," the "Races of Men," the "Comparative Grammar of the Polynesian Dialects," and the splendid volumes on Geology, Zoophytes and Crustacea, on Botany, and on Ethnography and Philology containing the studies, which have laid the foundation for all subsequent researches concerning the languages and migrations of the Polynesians and the peopling of the islands of the Pacific Ocean.

THE CRUISE OF THE U. S. BRIG DOLPHIN.—In the fall of 1851 the U. S. brig *Dolphin*, under the command of Lieutenant S. P.

Lee was commissioned for a cruise of research which had an important bearing upon the commerce of the world. For more than one hundred and fifty years there had been accumulating upon the charts of the North Atlantic representations of rocks and shoals,



frequently growing out of the vague reports of mariners resulting from misleading appearances of the sea and from mistaking one region for another, through the imperfect means formerly used by many navigators for determining geographical positions at sea. It

is unaccountable that no one of the great maritime nations had up to that time authorized an official search for these charted dangers, which were constantly delaying vessels by causing them to avoid the localities of the dangers, or rendering navigation uneasy or unsafe by neglecting this precaution. Besides being charged with the duty of investigating fifty-six of these doubtful dangers, with a view of definitely locating them upon the charts or else disproving their existence, the *Dolphin* was at the same time to be employed under the Act of Congress of March 3, 1849,

"for testing new routes, and perfecting the discoveries made by Lieutenant Maury in the course of his investigations of the winds and currents of the ocean."

To this latter end an hourly record was kept throughout the cruise of the force and direction of the wind, of the kind and direction of the clouds, of the readings of the barometer and thermometer, of the temperature of the water, of the limits of the currents and their force and direction, of the transparency and saltness or specific gravity of the sea water, and of its temperature at various depths.

The *Dolphin* was provided with means for sounding the ocean at great depths and made numerous measurements all along the track of the expedition which, as laid down in the instructions from the Navy Department, was first toward Europe and through that portion of the ocean around and to the northward of the Azores, in which many dangers had been reported to exist; thence westward to the Gulf Stream between 30° and 35° north latitude; thence easterly to examine the regions lying between the equator and 7° south latitude, and between 15° and 25° of west longitude, supposed to be volcanic and remarkable for its oceanic disturbances and tide rips; thence from the equator to Cape San Roque, sounding and carefully examining the currents between Fernando de Noronha and the mainland; thence after having satisfactorily examined the equatorial and Amazonian currents, homeward, crossing four times over a strip of the sea remarkable for its temperatures, lying about 150 miles wide on each side of a straight line drawn from 37° west longitude on the equator to Cape Charles, Virginia.

The *Dolphin* returned to the United States in the summer of 1852, after an absence of eight months, during which the navigation of the Atlantic had been made safer, and important contributions had been collected for the advance of meteorological knowledge and for the improvement of the existing notions concerning the physics of the ocean and its bathymetry.

EXPLORATIONS AND SURVEYS IN THE VALLEY OF THE AMAZON.—In 1851 the Government of the United States, impressed with the importance to this country and to all Christendom of opening the valley of the Amazon to trade and commerce, sent an expedition under the direction of the Navy Department to explore this river and its tributaries and to gather information not only respecting the condition of the valley at that time with regard to the navigability of its streams, to the number and condition, both industrial and social, of its inhabitants, to its climate, soil, and productions, but also respecting its capabilities for cultivation, and the character and extent of its undeveloped commercial resources, whether of the field, the forest, the river, or the mine.

While negotiations were in progress to obtain the consent of Brazil to the proposed exploration, Lieutenant William L. Herndon, then serving on the west coast of South America, was detached from the service afloat and directed to proceed to Peru and Bolivia for the purpose of collecting, from the archives of the monasteries and from other authentic sources, information concerning the headwaters of the Amazon. He succeeded in obtaining much knowledge that proved valuable in his subsequent duties as senior officer of the expedition, and he also made extensive investigations into the condition of the silver mines of those countries and into the probable effect upon them of the opening of the Amazon to commerce

The expedition was organized at Lima, Peru, in the Spring of 1851, and proceeded inland from the Pacific coast. They had not gone more than sixty miles from the seaboard before they found the waters of the Amazon sparkling at their feet and starting off to the eastward to go singing to the sea. At Tarma the expedition was separated into two parties; the first under Lieutenant Herndon proceeded by the Ucayali to the Amazon and thence throughout the whole course of that river to Pará, and the second under Lieutenant Gibbon, passing southward through Peru and Bolivia and down the eastern slope of the Andes and embarking upon the Mamoré River at Cochabamba, descended that river to the Madeira and thence to the Amazon.

Both parties were many months in drifting down, and though their food was of the coarsest kind and often scanty, they performed their duties with honor to themselves and credit to the country.

The results of their observations are published in two large octavo volumes of the Congressional documents, and include a complete meteorological journal, together with soundings of the

depths of the waters through which they passed and the geographical positions of important points and places.

In 1878, the Navy Department sent the U. S. S. *Enterprise*, under the command of Commander T. O. Selfridge, Jr., to survey the Amazon and Madeira. From the results of this work, the Navy Department published navigational charts of the Amazon up to the bar of the Rio Negro, and of the Madeira up to the falls of San Antonio. These charts have been translated into foreign measures and foreign tongues, and to-day the commerce of the world in the valley of this, the most majestic and mighty river of the world—whether it be considered in respect to the volume of water discharged, or to the extent of its navigability, or the area of the country drained by it—is guided by the charts of the Naval Service of the United States.

THE NAVAL EXPEDITION TO JAPAN.—From the time that the islands of Japan were first visited by European nations, until the middle of the present century, efforts had been constantly made by the various maritime powers to establish commercial intercourse with that country, whose large population and reputed wealth held out great temptations to mercantile enterprise. Portugal was the first to make the attempt and her example was followed by Holland, England, Spain, Russia, and finally by the United States. All these attempts, however, had thus far been unsuccessful, the permission enjoyed for a short period by the Portuguese to trade with the islands, and that granted to Holland to send annually a single vessel to the port of Nagasaki, hardly deserving to be considered exceptions to this remark. China was then the only country that carried on any considerable trade with Japan.

So vigorously was this system of exclusion carried out by the Japanese that foreign vessels were not permitted to enter their ports in distress, or even to do an act of kindness to their own people. In 1831 a Japanese junk was blown out to sea and, after drifting about for several months, was cast ashore near the mouth of the Columbia River in Oregon. An American ship, the *Morrison*, undertook to carry the survivors of the crew back to their country, but on reaching the Bay of Yedo, she was fired into from the neighboring shore. She repaired to another port of the island, but meeting with the same reception there, she returned to America with the Japanese on board.

When vessels were wrecked or driven ashore in Japan, their crews were subjected to the most cruel treatment. In the year 1846

two American whaling ships, the *Lagoda* and the *Lawrence*, were wrecked on the shores of the Island of Honshiu and their crews were captured and treated with great barbarity. It is believed that their lives were only spared through the intercession of the Dutch Governor of Desima, at Nagasaki.

That the civilized nations of the world should have thus submitted to such treatment by a weak and semi-barbarous people can only be accounted for on the supposition that, from the remoteness of their country, instances of such treatment were of rare occurrence, and the difficulty of chastising them very great. It can hardly be doubted that, if Japan were situated as near the continent of Europe or America as it is to that of Asia, its people would long before this time have been treated as barbarians, or else would have been compelled to respect those usages of civilized states of which they had been receiving the protection.

The Government of the United States had made two attempts to establish commercial intercourse with Japan. In the year 1832, a Mr. Roberts was appointed a special agent of the Government with authority to negotiate treaties with sundry nations in the East, and among others, with Japan; but he died before he arrived in that country. In 1845 Commodore Biddle was sent with two vessels of war to visit Japan and to ascertain whether its ports were accessible. He was cautioned however "not to excite a hostile feeling, or a distrust of the Government of the United States." He proceeded to Yedo, but was told that the Japanese could trade with no foreign nations except the Dutch and the Chinese, and was peremptorily ordered to leave the islands and never to return to them.

By the middle of the century the valuable interests of our country growing out of the acquisition and rapid settlement of our vast territory bordering on the Pacific, the discovery of gold in that region, the navigation of the ocean by steam, the rapid communication established across the isthmus that separates the Atlantic from the Pacific, had so multiplied in the seas of the East that our intercourse with those parts of the world was already greatly increased and gave promise of such important future extension, that the duty of protecting the American citizens whose vocations called for the navigation of those seas could no longer be deferred on the part of the Government of the United States. Accordingly, in November, 1852, under the authority of the President of the United States, the Navy Department organized an imposing naval expedition to proceed to the Empire of Japan under the command of Commodore

Matthew Calbraith Perry, an officer of great prudence and firmness, for the purpose of opening negotiations to bring this estranged but cultivated people into the family of nations, and for the further purpose of exploring the coasts of Japan and of the adjacent continents and islands, and collecting the hydrographic information necessary for the construction of charts.

The expedition was at first designed to consist of the steam frigates *Susquehanna* and *Mississippi*, the steamers *Princeton* and *Alleghany*, the corvette *Macedonian*, the sloops *Plymouth*, *Saratoga* and *Vandalia*, and the storeships *Supply* and *Southampton;* but by April, 1853, only the *Susquehanna*, *Mississippi*, *Plymouth*, *Saratoga* and *Supply* had assembled on the coast of China, and in the latter part of May, leaving the *Plymouth* at Shanghai to guard the interests of resident citizens of the United States against the effects of the prevailing rebellion, Commodore Perry proceeded with the *Susquehanna*, *Mississippi*, *Saratoga* and *Supply* to the Liu Kiu Archipelago, a dependency which the Empire of Japan had conquered centuries before, but whose sovereignty was then disputed by the Government of China. Here a port of rendezvous was established at Naka, and by kindness and gentle treatment on the part of the Americans a friendly intercourse with the inhabitants grew up, during which exhibitions of the daguerreotype, the magnetic telegraph, the submarine armor and other scientific apparatus were made, to the utter astonishment of the people.

While waiting at Naka to conciliate and gain the confidence of the people of Liu Kiu before venturing to visit Japan, the Commander-in-Chief sailed in June for the Bonin Islands with the *Susquehanna* and *Saratoga* and entering Port Lloyd, the principal harbor of the group, established there a port of refuge and refreshment for our vessels traversing those distant seas. He caused the principal islands to be explored and a few animals to be placed upon two of the groups as a commencement of a provision for future wants, and he also distributed many varieties of garden seeds among the settlers, and held out to them hope that implements of husbandry would be furnished. The journal of the Expedition contains a good geographical description of the Bonin Islands, and an account of the survey of Port Lloyd, a chart of which was made for the use of our Government after the return to Naka, and subsequently transmitted to Washington, together with charts of the ports of Naka and Melville, of the Liu Kiu group. Satisfied with the disposition of the Liu Kiuans, the squadron, joined by the *Plymouth*, which had come from China, sailed for Japan in July and, entering the Bay of

Yedo, opened communications with the Emperor of Japan. Perry conducted himself with admirable dignity and address and, overcoming or carrying along a multitude of obstacles born of fear, deceit and intrigue, succeeded in bringing about a satisfactory interview with a first counsellor of the Empire.

The propositions of our Government having been presented to Japan, and extensive surveys of waters before unknown to foreigners, and extending to within a few miles of Yedo, carried on during the progress of the negotiations, having been concluded, the Commodore declared his willingness to await a reply until his return in the ensuing spring, and withdrew his squadron to the coast of China, with the exception of the *Plymouth*, which was despatched to the Bonin Islands to explore the interior of the islands and obtain information respecting their geological formation, the character of the soil, the quality of the timber for mechanical purposes, the animals, birds and reptiles, and the kinds and descriptions of fishes in the neighboring waters. During the winter of 1853 and 1854 a detachment was left at Naka to look out for the coal sheds which had been built there, to keep in their proper places the buoys which had been planted in the harbor, and to board outside and pilot into port such vessels as appeared off the harbor. Writing about this time to the Navy Department, Perry said:

> "It is self-evident that the course of coming events will ere long make it necessary for the United States to extend its territorial jurisdiction beyond the limits of the Western Continent, and I assume the responsibility of urging the expediency of establishing a foothold in this quarter of the globe, as a measure of positive necessity to the sustainment of our maritime rights in the East."

All through the winter during which the vessels of the squadron went from place to place on the coast of China in answer to appeals for protection on the part of American merchants residing in the various maritime cities, the Commander-in-Chief, well knowing that the ultimate success of his mission to Japan would depend entirely upon the means that he might secure for overawing a people remarkable for their sagacity, was making strenuous efforts with the Government at Washington to secure the additional vessels that were originally named to accompany his squadron.

He sailed from China early in the year 1854 with an imposing squadron of seven vessels and again arriving in the Bay of Yedo on the 13th of February, he landed with great pomp upon the shores of Japan and accomplished the great object of effecting an advantageous compact, which secured protection and kind treatment to all Americans who might, by chance or design, find themselves in

any part of the Empire of Japan, and which also stipulated that vessels of the United States should be entitled to obtain shelter and supplies, and secured privileges to our citizens never in the two preceding centuries conceded to any foreign people. It will be worth the while of those who know the glories of the Empire of Japan at the close of the nineteenth century to read this treaty, and see, in the opening of the treaty-ports of Simoda and Hakodate, the initiation of the wealth of Japan, intellectual and superior, her ideas and spirit, her achievements and enterprise, her abundant food supply, the sinews of war, and the inventions of peace.

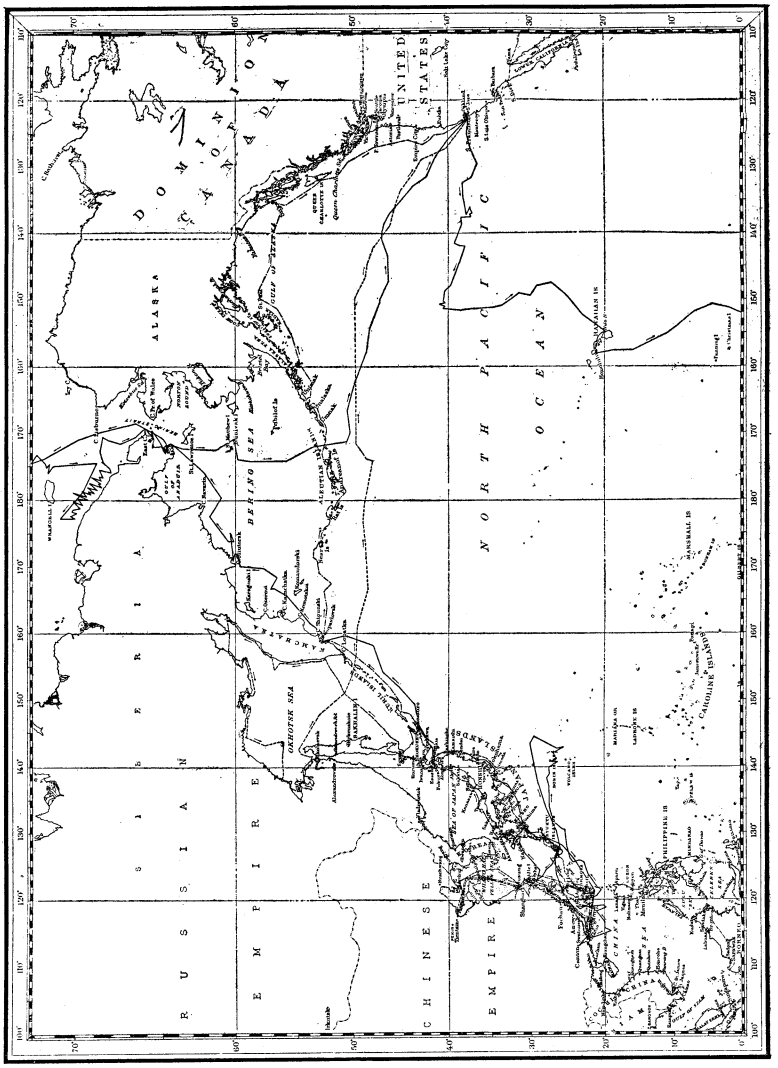
Thus did a naval commander reflect new honors upon the service to which he belonged and secure for his country, for commerce and for civilization a triumph whose blessings have enriched our own generation, and whose full fruition will be reaped in generations yet to come.

The United States North Pacific Surveying Expedition.—During the same year in which the Naval expedition to Japan was organized, a second expedition, somewhat allied in character and importance to the operations of Commodore Perry's squadron, was equipped for the exploration and survey of the China seas and the Northern Pacific. This expedition was authorized by an Act of Congress of August, 1852, which appropriated a large sum of money for use "in prosecuting a survey and reconnaissance for naval and commercial purposes of such parts of Bering Straits, of the North Pacific Ocean, and the China seas, as are frequented by American whale-ships and by trading vessels in their routes between the United States and China."

This cruise of exploration and survey, whose field of labor was to be in the Tropics as well as in the Arctic, was designed to extend over a period of three years. The vessels of the expedition were the U. S. Ship *Vincennes*, one of the staunchest and best sloops-of-war of that time, the propeller *John Hancock* and the brig *Porpoise.*

The command of the expedition was first assigned to Commander Cadwallader Ringgold, an officer who had already distinguished himself by his former participation in work of a like nature; and, to promote the scientific objects, an astronomer and hydrographer, a naturalist, and a botanist were appointed as a part of his staff. The vessels were to sail directly for the Pacific early in 1853, doubling Cape Horn, and proceeding by way of the Hawaiian

Islands, to Bering Strait, in time to commence work at the opening of the season for surveying operations in that quarter. It was designed that the expedition should be employed in the reconnaissance of these high latitudes from June until October during each



of three successive years. The remaining part of each year was to be devoted to the prosecution of surveys and explorations in the lower latitudes, on the coast of Japan, in the China seas, and along the routes of navigation between our ports on the Pacific and the

East Indies. Particular attention was to be given to the survey of the seas and coasts through and along which our sailing ships were accustomed to pursue their trade.

Secretary John P. Kennedy wrote concerning this expedition:

"Being persuaded that the Department cannot better contribute to the fulfilment of the high expectations, which the country has ever entertained as to the value of the navy, nor perform a more acceptable duty to the navy itself than by imparting to this arm of the national power the highest spirit of enterprise as well as the greatest efficiency of action, I have sought every opportunity to put in requisition for useful service the various talent, skill and ambition of honorable adventure, which equally distinguish and embellish the professional character of the officers under the control of the Department. Constant employment of ships and men in the promotion of valuable public interests, whether in the defense of the honor of our flag, or in the exploration in the field of discovery and the opening of new channels of trade, or in the enlarging of the boundaries of science, I am convinced will be recognized both by the Government and by the people, as the true and proper vocation of the navy, and as the means best calculated to nurse and strengthen that prompt and gallant devotion to duty which is so essential to the character of accomplished officers, and so indispensable to the effectiveness of the naval organization."

The expedition, which was to have started early in 1853, did not leave Norfolk until June of that year, and the plan of reaching the Pacific by way of Cape Horn was changed in favor of the passage by the way of the Cape of Good Hope and the Indian Ocean. The storeship *John P. Kennedy* and the tender *Fenimore Cooper* were added to the squadron.

In due time the squadron reached Simons Bay, Cape of Good Hope, and from there proceeded to Hongkong, the *Vincennes* and *Porpoise* going by way of Van Diemens Land (Tasmania), through the Coral Sea, passing the Caroline and Ladrone and Bashee Islands, and arriving at Hongkong on the 17th of March, 1854. The *John Hancock*, *John P. Kennedy*, and *Fenimore Cooper* sailed through Sunda and Gaspar straits, the Carimata and Billiton passages, and the Sulu Sea, and arrived at Hongkong early in June, 1854.

During the absence of Commodore Perry with the greater part of the East Indian squadron in Japan, the civil war raging at that time in China, and particularly in Canton, so alarmed citizens of the United States residing in Hongkong, that Commander Ringgold considered it proper to suspend the special duties which had been assigned to him, and to render protection to his exposed countrymen. He thus failed to accomplish a large portion of the surveys which had been planned for the year 1854, and Commodore Perry, upon arriving at Hongkong, finding the expedition laboring under serious disadvantages owing to an affliction of Commander Ringgold, which necessitated the return of that officer to the United

States, placed the next ranking officer, Lieut. John Rodgers, in charge of the expedition, which left Hongkong early in September, 1854, the *Vincennes* proceeding eastward to survey the Bonin Islands, the Liu Kiu group, and the islands to the westward, and the *John Hancock* and *Fenimore Cooper* sailing northward through Formosa Channel into the Yellow Sea. After surveying Bullock Harbor, these two vessels proceeded northward to Shanghai, and thence to the Gulf of Pechili, reaching the mouth of the Pei Ho in November, 1854. Here a survey was made of the entrance of the river, as well as of Miao Tao Strait and of the approach to Shaluitien Banks. The expedition returned to Hongkong in February, 1855, with the exception of the *Porpoise*, which parted company with the *Vincennes* on September 24, 1855, in mid-channel between Formosa and the coast of China, to the northward and westward of the Pescadores, and was never heard of again. She was probably lost in a typhoon of great intensity which occurred about a month after the separation, and in which the *Vincennes* narrowly escaped. After performing certain duties, the *Porpoise* was to have met the *Vincennes* in the Bonin Islands. Having waited there somewhat after the appointed time, the *Vincennes* went in search of her without finding any clue to her fate. Subsequently the *John Hancock* and the *Fenimore Cooper* thoroughly explored the Pescadores Islands and the shores of the Island of Formosa, but without bringing tidings of the fate of the *Porpoise*. The expedition again left Hongkong in March, 1855, to complete the survey of the lands between Liu Kiu and Japan. The *Vincennes* and *Hancock* then sailed along the east coast of Japan and surveyed Shimoda Harbor and the adjacent coast. At Shimoda Commander Rodgers had to intercede with the Japanese authorities in behalf of two American families who had taken up residence there and whom the Japanese, in their construction of the treaty, then recently concluded by Commodore Perry, would not allow to stay longer at that place. From Shimoda the two vessels continued northward to Hakodate, with the steam-launch of the *Vincennes* under command of Lieutenant John M. Brooke running inside close along the shore, making observations and doing surveying work. At Hakodate they were joined on June 5, 1855, by the *Fenimore Cooper*, which vessel had sailed through Korea Strait, and thence along the west coast of Japan into Tsugaru Strait. After surveying Hakodate and Tsugaru Strait, the *Vincennes* and *Fenimore Cooper* steamed along the southerly border of the Kurile Islands and reached Petropavlovsk, on the east coast of Kamchatka, on July 7, 1855.

Meanwhile the *John Hancock* had left Hakodate in the beginning of July, 1855, and passed through Tsugaru Strait into the Sea of Japan and thence northward close along the west coast of the island of Yezo, making a reconnaissance of the coast; then through La Perouse Strait into the Okhotsk Sea. Crossing to Kamchatka, she ran along the east shore of the Okhotsk Sea and then along the north coast to Ayan on the west side of the sea where a harbor survey was made. From Ayan this vessel proceeded southward and then eastward into the Gulf of Amur, and, after surveying there, left on September 16, rounded the north point of Sakhalin Island the next day, and, taking a southeasterly course, passed through Amphitrite Strait into the Pacific Ocean; and, continuing eastward, reached San Francisco on October 19, 1855, six days after the arrival of the *Vincennes*, and eight days after that of the *Fenimore Cooper*.

The *Vincennes* and the *Fenimore Cooper* made a survey of Avatcha Bay and approaches, including the harbor of Petropavlovsk. After finishing this work the two vessels separated to take up different routes of survey. The *Fenimore Cooper* proceeded to Atka Island, in the Aleutian group, to make inquiries regarding the fate of the officers and crew of the whale-ship *Monongahela*, which was supposed to have been lost, in the autumn of 1853, in attempting the passage between Seguam and Amukhta Islands during a gale. These islands were thoroughly examined and diligent inquiry was made at Atka, but no trace of the crew was obtained. The *Fenimore Cooper* then steamed along the south side of Unmak Island to Dutch Harbor, Unalaska. Leaving this harbor on September 5, 1855, the homeward trip was made along the Alaskan coast and islands, to Sitka, and thence southward along the North American continent to San Francisco, which was reached on October 11, 1855.

The *Vincennes* left Petropavlovsk on July 14, and entering Bering Strait on the 16th, reached the harbor of Glasenapp, on the Asiatic continent, on August 1. After surveying this harbor and the straits of Seniavine, Commander Rodgers left a party under Acting Lieutenant Brooke, with the steam-launch of the *Vincennes*, at Glasenapp Harbor to make observations during his absence in the North. He proceeded northward for the purpose of verifying the position of land, placed upon the charts on the report of Captain Kellet, of H.M.S. *Herald*, in about latitude 72° North, longitude 175° West, and to examine, if possible, Plover Island, reported to have been seen by the same officer, and then endeavor to reach

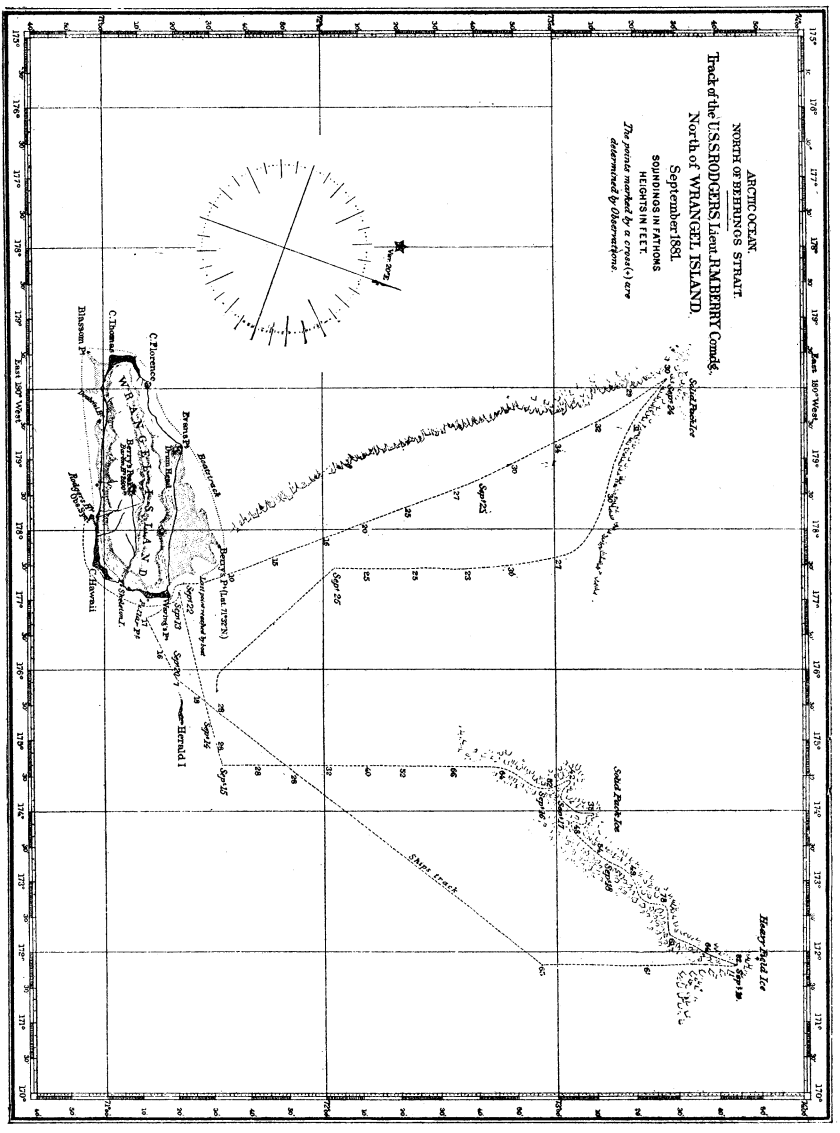
Wrangel's Land, described to Wrangel by the natives as visible in clear weather from Cape Yakin. Running over the end of Herald shoal, he passed Herald Island and stood to the northward until he passed over the position of the land shown on the British Admiralty chart, and came to anchor in 42 fathoms in latitude 72° 05′ North, longitude 174° 37′ West. It was so clear that the horizon was apparently without limit. No land could be seen from the royal yards, and the water so far as the vision could reach was free from ice. Rodgers then returned to Herald Island, the southeast point of which he determined in 71° 21′ North, 175° 20′ West. From the summit of this island no land could be seen in any direction although the horizon was clear. Running towards Plover Island, when half way from its alleged position his progress was arrested by a barrier of ice. No land could be seen from the masthead though the air was clear. He concluded therefore that the island did not exist and expressed the opinion that Captain Kellet must have been misled by appearances.

Running for Wrangel's Land—which at the time had never been seen by Europeans—when within 10 miles of its reported position in the open sea in latitude 70° 41′ North, longitude 177° 21′ East, he was again arrested by a barrier of ice and reluctantly turned about to the southward without having had a glimpse of the reported land. Curiously enough it was the vessel named after him, the U. S. S. *Rodgers*, which, 26 years later, under the command of Lieutenant R. M. Berry, U. S. N., succeeded in reaching and charting this land.

Having attained the limits proposed by him and penetrated, up to that time, further north than anyone else in the directions selected, he sailed southward, stopping at Lutke Harbor, St. Lawrence Bay, long enough to survey it, and then proceeded to Glasenapp Harbor, where he took on board Lieutenant Brooke and his party. Continuing southward through Bering Sea and Amuhkta Pass, he turned to the eastward on the homeward track to San Francisco, where he arrived on October 13, 1855, and found the *Fenimore Cooper* already in port.

The *Vincennes* remained at San Francisco until February of the following year, and after having been refitted, made another cruise of exploration and survey, sailing westward to about the meridian 151° West, searching for doubtful dangers, and then southward to Hilo Bay, Island of Hawaii. Having surveyed this bay and visited Honolulu, she returned to the United States by way of Cape Horn, arriving at New York on July 13, 1856.

Fifteen charts of harbors and special localities and twenty charts of island groups and extensive coasts and seas, among which was the first American chart of Bering Sea, resulted from the geographi-



cal work of this expedition. The natural history results, deposited in the Smithsonian Institution with those of Commodore Perry in Japan, Captain Page in the La Plata region, Lieutenants Herndon

and Gibbon in the valley of the Amazon, Captain Lynch in the Dead Sea, and Captain Hall in the Arctic regions, were of great magnitude, and embraced many new and rare species that were collected by the naturalists Stimpson and Wright, of the Scientific Corps of the Expedition, first under Commander Ringgold in the South Pacific and China seas and afterwards largely increased by those secured around Japan, Kamchatka, in the Bering Sea and Arctic Ocean, and on the Californian coast.

Upon the return of the Expedition the Secretary of the Navy wrote as follows:

"Commander Rodgers and his officers are entitled to the highest commendation for the ability and energy with which they have prosecuted the work to which they were assigned, and I have no doubt their labors will prove not only of great benefit to commerce but also interesting contributions to science."

THE EXPLORATION OF THE VALLEY OF THE LA PLATA AND ITS TRIBUTARIES.—Stimulated by the fruits of the exploration of the valley of the Amazon, the Navy Department issued instructions to Commander Thomas J. Page, of the United States Steamer *Water Witch*, to "survey and explore the River La Plata and its tributaries." He was also accredited at the same time by President Fillmore to act individually or jointly with our ministers near the governments of Brazil and Argentina to make a treaty of commerce and navigation with the republic of Paraguay.

The *Water Witch*, a steamer of about 400 tons burden, with a draft of 9 feet, sailed from Norfolk on the 8th of February, 1853. Although not adapted in all respects for the duty assigned to her, she, nevertheless, was better suited to it than any other vessel at that time available; and with an enlightened zeal for the promotion of commerce and the advancement of science, the Department availed itself of the limited means thus at its disposal for arriving at the objects of the expedition. The seal to the new waters, which the *Water Witch* was destined to explore and which had so long remained closed to navigation, had just been broken by a declaration on the part of the liberal and enlightened Provisional Director of the Argentine Confederation. The Government of the United States, promptly availing itself of this privilege, had now the satisfaction of demonstrating to the world the navigability of some waters previously unknown and of others to a far greater extent than had at any time previously been imagined. The *Water Witch* ascended the Paraná river to the point where the Paraguay flows into it, a distance of about 800 miles from Buenos Ayres; and then, passing by the Paraguay river through Paraguay and into

Brazil, reached the Brazilian military post of Corumba, situated more than 1,700 miles distant from Buenos Ayres. From the La Plata to Asuncion, which is farther from the mouth of the Rio de la Plata than St. Louis is from the mouth of the Mississippi, the depth of water found was no less than 20 feet. An equal depth was found for a distance of several hundred miles above Asuncion, and the expedition had ascended the Paraguay 700 miles above this place before less than 12 feet was encountered. Throughout this great journey on the Mississippi of the Southern hemisphere, the *Water Witch* met neither sawyer nor snag, nor was she interrupted by any bar or shoal.

This voyage was a refutation of the idea, held up to that time, that the commerce of these inland countries could never be carried on directly with the United States or Europe because vessels suited to the seas could not navigate these interior waters. The expedition disclosed the fact that steamers of four times the tonnage of the *Water Witch* could ascend these rivers at all seasons of the year nearly as far as the *Water Witch* had penetrated. It proved that some of the richest provinces of Brazil, whose products had before no outlet but the port of Rio de Janeiro, which was reached by laborious, dangerous and costly land travel, were directly accessible to steam navigation.

In addition to making these demonstrations concerning the Paraná and Paraguay rivers and their bordering provinces, Page traversed the Salado river for 800 miles and revealed the existence of a navigable water way through a region of surpassing richness, which had up to that time been regarded as a desert.

Throughout the extent of these explorations, the officers carried on a running survey based upon and checked by daily astronomical observations, and accompanied by numerous soundings of the depths of the rivers. From this survey, embracing an extent of river course of 3,600 miles and of actual exploration or travel by land of 4,400 miles, a series of charts were afterwards published which continued to serve for many years as a guide to the commerce of all nations upon the tributaries of the La Plata.

The acquisitions of the expedition in the domain of natural history were of the greatest importance to science and the industrial arts. They were comprehensive in character and, in the language of a distinguished naturalist of the Academy of Natural Sciences at Philadelphia:

"embraced specimens of quadrupeds, birds, reptiles, fishes, insects, crustacea, shells, minerals, plants, living and dead, with seeds and sections of wood, fossil

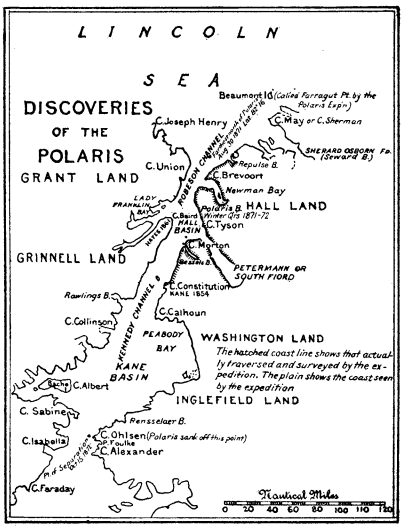
remains of fishes, &c. The aggregate is one of great magnitude, and may safely be said to constitute by far the largest collection ever made in South America by an American expedition. Notwithstanding the difficulties of preservation consequent upon the hot, moist climate, the specimens brought home are all in the finest possible condition. The collection is especially rich in the larger birds of Paraguay; in the hawks, eagles, ducks, geese, macaws, curassows, &c., several of which are believed to be new to science, and few of them previously brought to the United States.

"The fishes are in great variety, and will illustrate the formidable and rapacious character of all the inhabitants of the fresh waters of South America in being universally provided with sharp cutting teeth. A considerable proportion of all these are believed to be undescribed, as also of the invertebrata."

THE NAVY IN THE ARCTIC ZONE.—The middle of the nineteenth century saw the close, in the habitable portions of the globe, of the period of coast reconnaissance and island discovery which followed the period of circumnavigation and continental discovery; but the sea was unfathomed, the world had scarcely reached the threshold of the domain of oceanography, and within the northern hemisphere—the world's seat of population, wealth, and enlightenment—there remained a totally unknown area of the Frigid Zone of the extent of nearly three million square miles, within which were locked many facts of high importance to commerce and navigation and in the application of science to the arts of life. Within a half century new Arctic lands have been added to the map of the world, new whaling grounds have been discovered by which millions of dollars were added to the commerce of the United States, new species of birds, of animals, and of fishes have been found, and the knowledge has been turned to commercial as well as scientific value; minerals of value, not known to exist elsewhere, have been brought from the Arctic; interesting studies in ethnography and kindred sciences have been made, and our knowledge of the magnetism, meteorology, electricity, and of ocean currents has been greatly increased by the facts gathered in the penetration of these new regions.

In 1870 the President of the United States issued a special commission to Charles Francis Hall and directed him to report to the Secretary of the Navy for the organization of an Arctic polar expedition. By his energy, intrepidity, and perseverance, Hall had already attained results in Arctic explorations that were worthy of attention and of the patronage of the Government, which was implied in the Act of Congress appropriating money to support the expedition which he was about to command. A tug of 400 tons burthen, which had been laid up since the close of the Civil War,

was fitted out at the Washington Navy Yard to make the voyage, and significantly renamed the *Polaris*. The fearful proofs of the perilous adventure need not now be retold. The expedition passed through the waters between Greenland and British America as far as 82° 16′, an extent beyond all previous navigation toward the North Pole. More than seven hundred miles of coast line were discovered or recharted, and it then became known that Kennedy Channel extended beyond Cape Constitution, the highest point reached by Kane's Arctic Expedition, and that another body of water, which Captain Hall named Robeson Channel, in honor of the Secretary of the Navy, opens to the northward and has a very perceptible current toward the south. From the summit of an elevation, near the point at which the party wintered in 1871 and 1872, the land was seen extending as far north as the 84th degree of latitude. The scientific corps established an observatory at these winter quarters in Polaris Bay, in latitude 81° 38′, and made astronomical observations to determine its geographical position, pendulum observations for gravity, and also magnetic, meteorological, geological, botanical, and zoological investigations. They found Hall Land, the name given to the northward extension of Washington Land, to be comparatively rich in flora and fauna, and succeeded in enumerating eight species of mammals, twenty-three species of birds, fifteen species of insects, and seventeen species of plants.



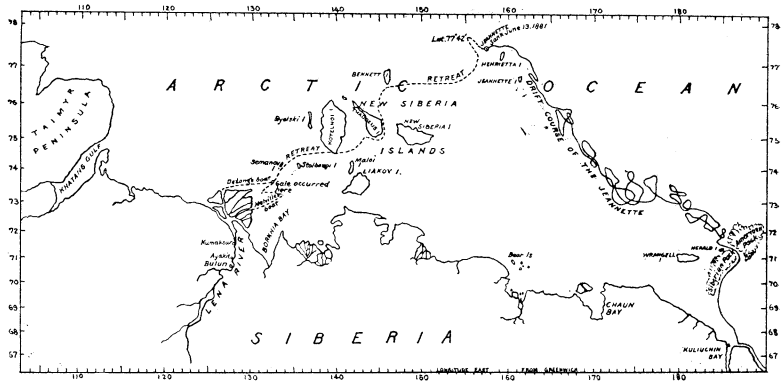
Captain Hall died at Polaris Bay in the Winter of 1871, and the expedition, attempting to return, was shipwrecked and so delayed in reaching the United States that the Navy Department sent out a relief expedition, in the course of which the U. S. S. *Juniata*, Commander D. L. Braine, the U. S. S. *Tigress*, Commander James A. Greer, and the *Little Juniata*, Lieutenant G. W. De Long, obtained results that still further added to the fruits of the original expedition.

De Long returned from this relief voyage imbued with the spirit

of Arctic investigation, and continued to urge the organization of another expedition until he was appointed to command the *Jeannette*, a vessel of American register, owned by Mr. James Gordon Bennett of New York, which Congress had authorized the Secretary of the Navy to accept and take charge of for purposes of North Polar exploration by way of Bering Strait. This ship, having been repaired, strengthened and fitted out at the San Francisco Navy Yard, sailed on the 8th day of July, 1879, with a complement of four commissioned naval officers besides Captain De Long, two civilian scientists, and twenty-four seamen enlisted under the naval regulations for special service; and, proceeding through Bering Strait, passed to the northwestward into the open space between the American and Siberian ice-packs, with the object of reaching the North Pole.

THE JEANNETTE IN THE PACK

Map showing her Drift to and fro with the ice and the line of the Crew's Retreat, as charted at Irkutsk by Lt. J. W. Danenhower, U.S.N.



She was frozen in almost immediately, and drifted with the ice-pack in a general northwesterly direction, as shown by the accompanying chart, over a shallow sea of an average depth of 30 fathoms to a position in 77° 15′ and longitude 156° 06′ east of Greenwich, where she was abandoned in the middle of June, 1881, in a sinking condition, after having been twenty-one months in the ice. The expedition then proceeded southward with sledges and boats, and the survivors reached the Lena Delta, in Siberia, about the middle of September of the same year. The new lands discovered by De Long appear upon the chart as Jeannette, Henrietta and Bennett Islands; and the observations made on board the *Jeannette* form a large and important contribution to the data of terrestrial physics.

In June, 1881, the U. S. S. *Rodgers*, Lieutenant R. M. Berry commanding, left San Francisco under the orders of the Navy

Department to search for tidings of the *Jeannette* Exploring Expedition in the Arctic Ocean. In the course of the fruitless attempt to penetrate the ice, the officers of the *Rodgers* first surveyed Herald Island, and afterwards circumnavigating and charting Wrangel Island, proved conclusively that what was formerly called Wrangel Land, and supposed by some geographers to be a part of the Asiatic continent, and by others a part of Greenland, is in reality an island about seventy miles long and thirty-five miles broad, in the south-eastern coast, of which, formed by a bight in the coast line, is a small but excellent harbor of moderate depth of water.

With a view of affording every possible means of relief to the Jeannette Expedition, the Navy Department determined, at the same time with the sending of the *Rodgers* through Bering Strait, to dispatch the U. S. Steamer *Alliance*, Commander G. H. Wadleigh, to the waters between Greenland and Spitzbergen. Subordinated to the orders relating to the main mission of the *Alliance* were the instructions issued to the commanding officer to make the fullest observations practicable of sea temperatures and other oceanic phenomena, including phosphorescence and specific gravity, with specimens from the surface and the bottom of the sea. Bench-marks were established at Saxe Haven, Iceland, and at Hakluyt's Headland, Amsterdam Island, for tidal and hypsometrical observations in accordance with the aims of the International Arctic Commission. The *Alliance* penetrated to latitude 80° 10′, and brought back floral and geological collections, specimens of birds and animals, and a large amount of important hydrographical data.